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ABSTRACT

This case study reports the use of token reinforcement in remedial reading instruction with an eleven-year-old boy from rural Appalachia. During phase one, tokens were given for reading 50-word passages without error; token value was contingent upon the number of attempts necessary to read without error. During phase two, words missed in phase one were presented individually, with medium-value tokens given for correct responses, and words missed were re-presented at the end of the series. Phase three was an exact replication of phase one, to provide a success experience following the early attempt and practice. Access to the remedial reading sessions was contingent upon appropriate classroom deportment. After fourteen half-hour sessions, reading comprehension and reading rate improved, and errors decreased. Classroom deportment improved dramatically when the "entrance to therapy" contingency was in effect. (Author/AA)

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A CASE STUDY USING TOKEN REWARD ON ORAL READING RATE, ERROR REDUCTION, AND COMPREHENSION OF A READING DEFICIENT CHILD[1,2]

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Staats and Butterfield (1965) were the first researchers to systematically apply laboratory-tested learning principles to the acquisition of reading skills. Their research suggested that inadequacies in motivation (i.e., reinforcement) account for the reading deficits of many children. Reading deficits, in turn, are often accompanied by underachievement in other academic areas which require a basic reading foundation. Peers may further intensify the underachiever's problems by laughing at or teasing his attempts to learn. To avoid or escape such aversive ridicule, and to "maintain face," the underachiever frequently withdraws all academic effort and frequently becomes the class "clown" or "trouble maker." In so doing, he avoids competition and its aversive consequences because he "does not want to," rather than because he cannot, successfully compete.

The remediation task often becomes, then, one of determining sufficiently effective contingencies of reinforcement to motivate on-task reading behavior and to provide success, rather than failure, experiences for the underachiever. Staats and his colleagues (1964, 1965, 1967, 1969, 1970) reported several successful attempts at reinforcing reading behavior with tokens backed up with monetary value. Parents, teachers, and high school students were all used as reading therapists for juvenile delinquents and

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culturally deprived subjects. Generally, sessions consisted of the training of new word acquisition, oral reading, silent reading and comprehension. No contingencies were placed on reading rate. Scientific Research Associates reading materials were adapted for use in the remedial training.

The present paper represents an attempt to apply learning principles to the acquisition of reading skill of a fifth grade culturally deprived boy of Appalachia. The study differs from those of Staats and his associates in several ways. First, the state adopted reading series is used as a remedial training vehicle. Second, although improvement in comprehension is of concern and measured, reward contingencies focus solely on oral reading rate and error reduction. Third, rather than omitting the remainder of a paragraph containing an error until a story is completed, S must respond to all words in a segment correctly before continuing to the following segment. Finally, entrance to the remedial reading session is contingent upon appropriate extra-therapy classroom behavior.

Method

Subject. S (Ron) was an 11-year-and-3-month boy about to finish his second tour of the fifth grade in a rural, Appalachian, elementary school. Although he was detained at no other level, he had continually received failing grades in nearly all subjects. He was described as having "no respect for teachers" and a user of extremely foul language. Various teachers labelled Ron as "mischievous," "unpredictable," "temperamental," "hyperative," an "attention seeker," "dull," "unmotivated," and "lacking interest." A school counselor characterized him as having a "poor attention span" and "lacking intellectual ambitiousness."

Ron received Full Scale IQ scores ranging from 101 at [illegible] years-11-months (Otis Form AS) to 73 at 10-years-11-months (Otis Form J). On the

Stanford Achievement Test, Intermediate Form X, given just prior to the start of the present study, Ron received Reading Test Grade Scores of 2.5 and 2.8 on tests 1 and 2, respectively. The fifth grade teacher explained that because he could barely read, Ron requested help with virtually half of the words in classroom assignments or tests. Help was frequently requested for a simple word given earlier in the same sentence. A fuss ensued if he was not immediately helped.

Reinforcer System. A token reinforcement system somewhat similar to that of Staats and Butterfield (1965) was used in the present study. Tokens consisted of large colored check marks placed on a data sheet which was attached to Ron's desk. Blue, red, and yellow check marks were worth 6, 4, and 2 points, respectively. Points could be exchanged daily or saved for various privileges and treats preselected by Ron (i.e., hall monitor, 40 points; various errands, 30 points; ice cream bar, 30 points; etc.).

Pre- and Post-Treatment Tests. The Sheldon Basic Reading Series (1968) was used to determine pre- and post-treatment reading rates and error percentages. Three 3-minute periods of reading were recorded on a cassette tape recorder for each of four (grade 2-level 1, grade 2-level 2, grade 3-level 1, and grade 3-level 2) reading levels for the pre- and post-tests. A 3 minute performance was obtained from the first, second, and third of each book. Post-test readings were not selected from pages immediately preceding or following pre-test passages. As Ron read, he was told the correct word if (a) he asked, (b) he erred, or (c) 5 seconds elapsed without a response. Tapes were later scored independently by two observers for reading rates and errors until perfect agreement was obtained. Alternate form Reading Tests 1 and 2 of the Stanford Achievement Test were administered prior to and following training.

Procedure. A student teaching aide (TA)[3] carried out the remedial reading therapy. Each of fourteen sessions lasted approximately 30 minutes and consisted of three phases.

Phase I began by allowing Ron to read for exactly 10 minutes from a book of the Macmillan Graded Reading Series (1965) levels 2-1 to 4-1. The selected passages were divided into 50 word reading segments. When correct reading responses were made to each word in a reading segment a blue check mark (high value) was placed on the data sheet in full view of Ron along with a word of praise (e.g., "Fine," "Good"). Ron then continued to the following segment. When a reading segment contained an error, he was corrected and instructed to spell and repeat the word correctly while looking at it. The segment was then completed without reward and immediately repeated. If no incorrect response occurred during the second reading of the passage, a red check mark (medium value) was presented and Ron continued to the following reading segment. If an incorrect response occurred, no reward was given and the segment was again repeated. Perfect performance on the third or subsequent reading of a segment was rewarded with a yellow check mark (small value). At the start of each session it was carefully explained to Ron that it was to his advantage to read as quickly as possible without error during the fixed 10-minute Phase I time interval. TA modeled the reading contingency and answered any questions prior to the start of the program. The number of tokens obtained, words missed, segments repeated and segments completed were tabulated before continuing to Phase II.

Phase II of each session immediately followed Phase I. TA printed each incorrect Phase I reading response on a separate 3 x 5 index card. Stimulus words were presented individually and Ron was asked to pronounce them. A correct response to a word-stimulus card was reinforced with a

mid-value token. Following the correct response to a word, that card was dropped from the group of cards yet to be presented. When an incorrect response occurred, however, TA pronounced the word and Ron was asked to spell and recite the word while looking at the card. The word was neither dropped from the group of cards nor reinforced until it was later read correctly without prompting. If an error occurred to a word-stimulus, a 2-point token was awarded when responded to correctly on subsequent presentation.

Phase III was initiated immediately upon completion of Phase II and was an exact duplication of Phase I. Ron began by reading the same passages under the same reward contingencies. At the completion of Phase III, he assisted TA in plotting a bar graph illustrating the improvement (tokens earned) from Phase I to Phase III.

Remedial reading sessions lasted approximately 30 minutes daily. Sessions 1-3 and 12-14 began at 11:30 each day. Access to sessions 4-11, however, were contingent upon the reception of seven check marks placed on the blackboard by his classroom teacher. A check was awarded for each 15 minute interval in which no "classroom disruption" (hitting, shouting, swearing, out of seat without permission, etc.) had taken place. Although extra-therapy department contingencies were not in effect for the first and last three days, length of time to accumulate seven checks (hypothetically during baseline sessions) was calculated throughout the program.

Results

The remedial reading sessions were quite successful. As can be seen from Fig. 1, reading rate (1a) was an inverse and percent error (1b) a direct function of the grade level of the reading test material prior to training. This trend was less marked over the post-test series; especially for error

responses. Of greater importance is the finding that post-test reading rate averaged 15 wpm higher than pre-test rates. Furthermore, post-test errors averaged 16% lower than pre-test errors across second-grade passages and 33% lower across third grade passages even though Ron was reading more rapidly.

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Insert Fig. 1 about here
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Error responses per 100 words ranged as high as 48 on pre-test passages but never exceeded 9 on any post-test passage. Alternate form Stanford Reading Test Grade Scores, Tests 1 (word meaning) and 2 (paragraph meaning) improved from 2.5 to 3.0 and 2.8 to 3.5, respectively.

Fig. 2 clearly indicates that although the difficulty of the graded reading material increased, the number of segments completed (2a) within the 10 min. alloted period increased as training progressed while the number of segments repeated (2b) decreased. More segments were completed and fewer

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Insert Fig. 2 about here
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repeated daily in Phase III than in Phase I. Similarly, despite an increase in words (segments) responded to, a marked decrease in the number of words missed (2c) was recorded across sessions. Fewer words were incorrectly responded to during Phase III than Phase I. This trend, however, was less marked toward the end of training, perhaps due to a ceiling effect. That is, few incorrect responses occurred in the final sessions during Phase I. Finally, Fig. 2d shows that the number of tokens earned in Phases I and III increased as training progressed--more being earned in Phase III than in Phase I.

Fig. 3 shows the length of time required for Ron to earn seven check marks contingent upon 15 minute intervals of appropriate classroom deportment. Far more time was required to earn seven check marks on the first

three days of training (baseline), during which time check marks were not a

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Insert Fig. 3 about here

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prerequisite for entering reading sessions, than after the contingency was established. Although the contingency to enter the session was removed during the last three training sessions, inappropriate classroom behavior remained minimal.

Discussion

Although there is no way of knowing the extent to which Ron would have acquired reading proficiency without the remedial program, he showed little improvement, despite much individual help, during the five years prior to treatment. Nevertheless, the results of this study are supported by the earlier research of Staats, et al. (1966, 1969, 1970) which demonstrated that the contingent presentation of token rewards can be successfully administered by paraprofessionals to enhance academic performance. The remedial reading program was administered efficiently and effectively with little effort and time demanded of the classroom teacher. Because tokens were exchanged primarily for privileges which "better behaved and motivated" peers already received, the total cost of the program was minimal; less than $4.00. State-adopted reading texts represented the only necessary remedial training material. The fact that remedial reading sessions could effectively be used to reward "appropriate" classroom deportment provides behavioral evidence to support Ron's verbal claim that he enjoyed remedial training. The classroom teacher reported she was especially "delighted at the overall improvement in effort and manners" throughout the duration of the project. No such improvement occurred prior to the program even though teaching aides and classroom peers had been assigned to Ron for special individual help.

No specific reading comprehension training such as used by Staats et al. (1965) was included in the present program. After considerable observation, the staff determined that the primary problem was one of lack of motivation to read. Ron had basic phonic skills, but would look around after reading a single word and continually ask for and receive help--even for words given him a short time previously. The remedial contingencies were directed, therefore, at reducing inter-response time (increasing rate) and errors. The probability of cognitively associating earlier to current words in a passage was assumed to increase and indirectly enhance comprehension as reading rate increased. Reading a complete segment, rather than skipping to the following segment after an error, was also designed to facilitate paragraph comprehension. Further, it was assumed that if reading deficient Ss were motivated to spend more time responding with shorter inter-response times, more total responses would lead to greater reading proficiency and comprehension. The increase in pre- to post-training word and paragraph meaning scores on the Stanford Reading Test tends to support these assumptions. Reading from the same starting point and graphing progress from Phase I to Phase III within each session, was designed to emphasize success and enhance motivation to perform. The high stable performance rates during training (even as the reading task increased in difficulty) suggest that on-task motivation was never a problem during remedial training.

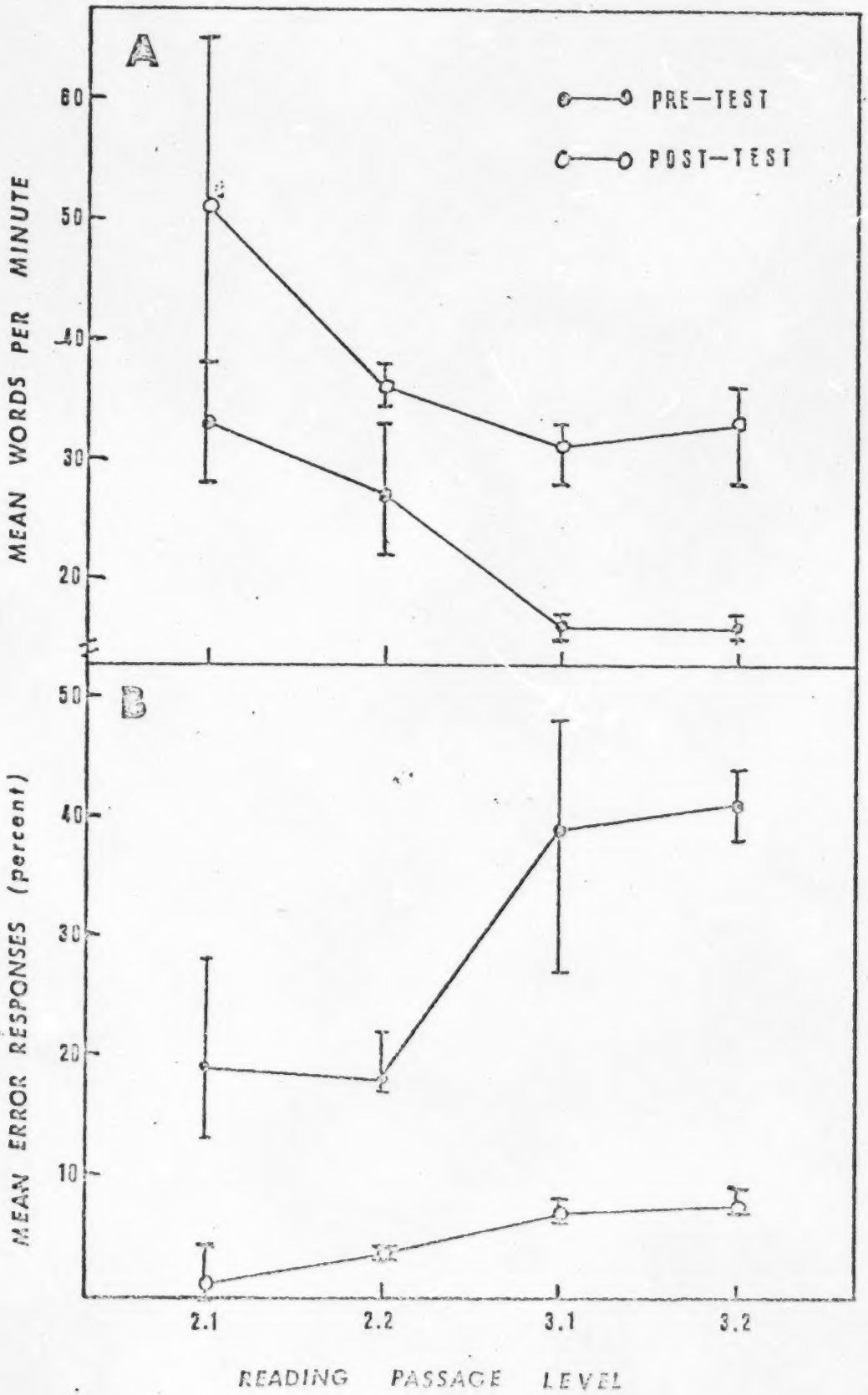
Although the lack of an experimental format prohibits estimation of the proportion of the change in reading proficiency due to treatment, it is important to note that whatever proficiency developed, did so over a mere fourteen one-half hour remedial reading sessions.

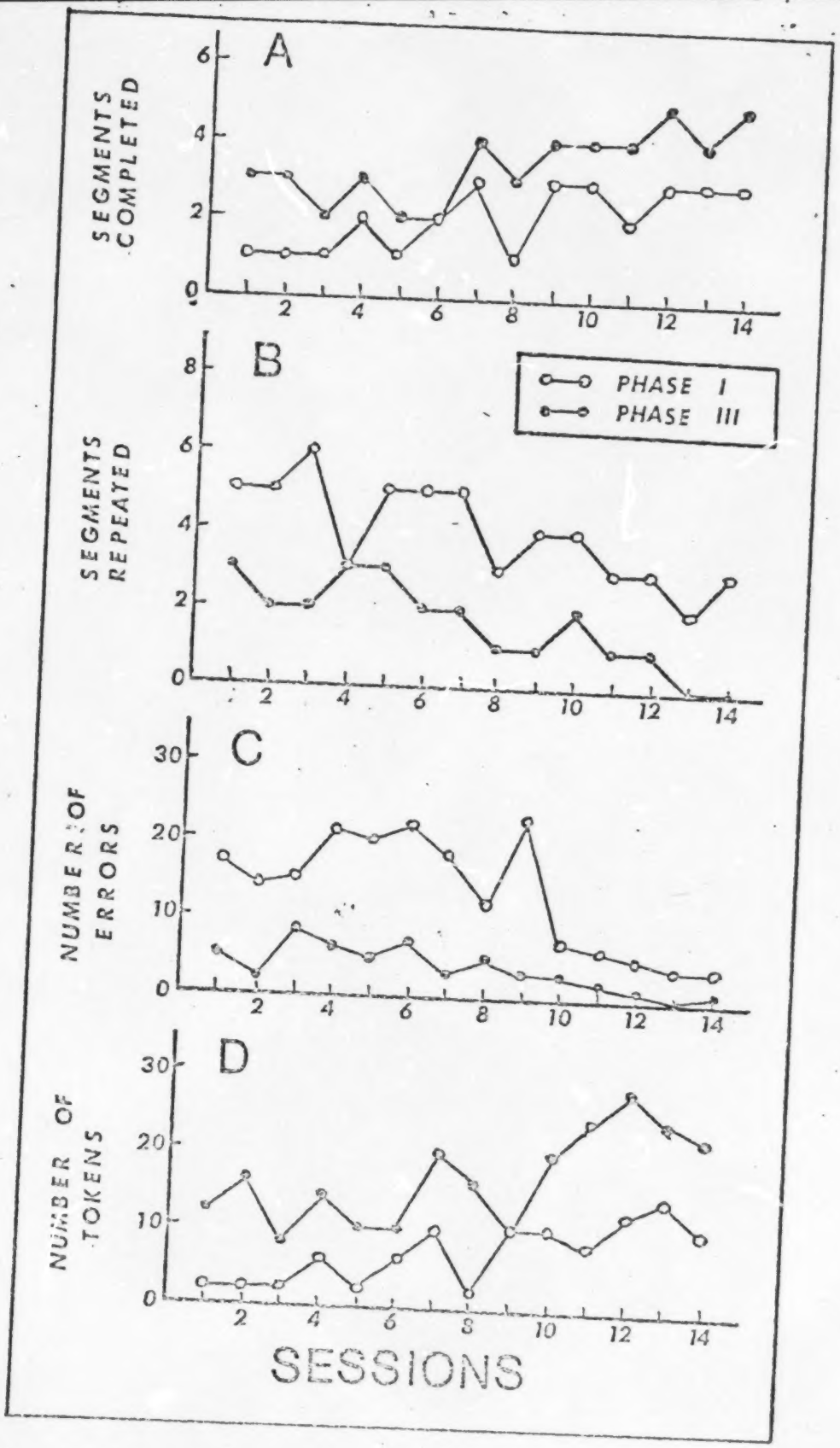
Figure Captions

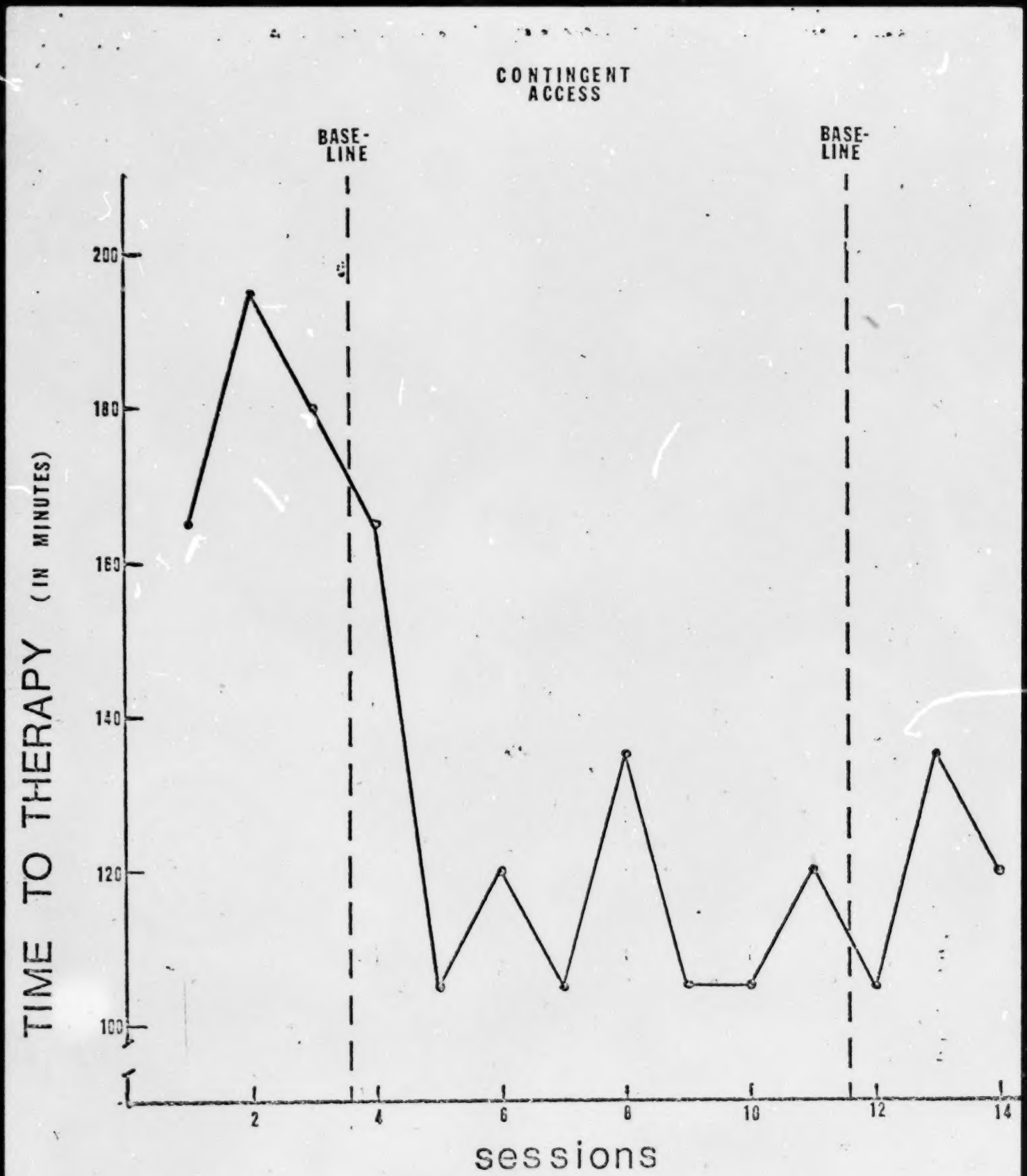
Fig. 1. Mean pre- and post-test words per minute (a) and percent errors (b) as a function of the grade level of the reading material. Each data point represents the mean score of three three-minute samples at a given grade level. The vertical lines represent the range of the scores at a given grade level.

Fig. 2. Number of segments completed (a), segments repeated (b), errors (c), and tokens earned (d), during Phase I and Phase III as a function of the daily training sessions.

Fig. 3. Time required to enter reading therapy as a function of daily sessions. Contingencies were not in effect during sessions 1-3 and 12-14.


A
PRE—TEST
POST—TEST
MEAN WORDS PER MINUTE
60
50
40
30
20
B
MEAN ERROR RESPONSES (percent)
50
40
30
20
10
2.1
2.2
3.1
3.2
READING PASSAGE LEVEL


A
SEGMENTS COMPLETED
B
SEGMENTS REPEATED
PHASE I
PHASE III
C
NUMBER OF ERRORS
D
NUMBER OF TOKENS
SESSIONS


CONTINGENT ACCESS
BASE-LINE
BASE-LINE
TIME TO THERAPY (IN MINUTES)
200
180
160
140
120
100
2
4
6
8
10
12
14
sessions

Footnotes

[1]This study was supported by Appalachian State University Research Incentive Funds. Reprints may be obtained from Paul A. Fox, Department of Psychology, Appalachian State University, Boone, NC 28608.

[2]We gratefully acknowledge the cooperation and assistance of Mary Blankenship, teacher and Max Hamby, principal at Mulberry Elementary School, North Wilkesboro, NC.

[3]The remdial training sessions were carried out by Tony Griffin who was assigned to the school as a teaching aide while participating in the Appalachian State University Teacher Training Complex.

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